

Hypertension, as an iceberg disease in the high hilly areas of Nepal

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Abstract

Introduction: Hypertension simply is usual blood pressure of 140/90 mm Hg or higher in otherwise normal individuals and even lower for certain high-risk patients. It is a common medical condition worldwide. It is the most important, commonest and correctible cardiovascular risk factor and one of the leading causes of death. Many factors like dietary, behavioral, psychological, environmental, genetic etc have direct or indirect influence on hypertension. In this study we have analyzed the prevalence and different stages of hypertension in a remote and high hilly area of Nepal.

Methods: The study was conducted in high hilly area adjoined to Solukhumbu and Dolakha districts. Altogether 600 participants were enrolled in the study. Participants having age more 18 years, regardless of symptoms, willing to give consent were involved. Demographic data and blood pressure was recorded twice. The 1st reading was taken by trained nursing staff using standard Riva Rocci Sphygmomanometer after five minutes rest. The 2nd reading was taken by Physician and mean was calculated from both readings.

Results: Among 600 patients involved in the study, the mean age was 48 years. Among them, 92 patients were having prehypertension including 53 male and 39 female. The stage I hypertension was found in 130 cases, out of them 77 were male and 53 were female. Whereas stage II hypertension was found in 84 cases, including 40 males and 44 females. Prehypertension was commonest among 40-49 years of age, stage I and stage II hypertension was commonest among 50-59 years. Systolic hypertension was more common in younger and elderly participants whereas diastolic hypertension was more common in middle age adults.

Conclusion: In the study, the incidence of hypertension increases whose age was found between 50-59 with age till 50-59 years age group. Systolic hypertension was more common than diastolic hypertension in less than 30 years age group whereas between 30-59 years diastolic blood pressure was more commonly found than systolic blood pressure. In the elderly of more than 60 years, again systolic hypertension is more predominant than diastolic hypertension.

Key words: hilly area, hypertension, prevalence, salt,

Introduction

Systemic hypertension is a common condition and affects around 1 billion people worldwide. It is the most readily identifiable and reversible risk factor for myocardial infarction, stroke and heart failure. Because of increasing obesity and population aging even in developing countries, the global burden of hypertension is rising further and

hypertension remains the leading cause of death worldwide and one of the world's great public health problems¹ It is generally asymptomatic and hence diagnosis may be delayed. Effective treatment also requires continuity of care by a knowledgeable physician and frequent medical checkups, which are less common worldwide. Poor compliance, drug costs, side effects and insufficient time for patient education contribute to nonadherence. For all these reasons, blood

pressure is adequately controlled only in less than one third of affected individuals, even in developed countries.² Even among patients whose hypertension is assumed to be well-controlled by current standards, fewer than one in three is protected from subsequent stroke, myocardial infarction, or heart failure.³

Hypertension currently is defined as a usual BP of 140/90 mm Hg or higher, BP levels for which the benefits of pharmacological treatment have been definitively established in randomized placebo-controlled trials.⁴ But for certain high-risk patients, such as those with established CAD, Diabetes and chronic kidney disease even lower value is preferred.⁵ The prevalence increases with age, rising exponentially after age 30. Before age 50, the prevalence is somewhat lower in women but after menopause, the prevalence increases even in women.⁶ Its prevalence also varies in different ethnicities and races. Among U.S. adults, around 40 percent of blacks have hypertension compared with 25 percent of whites but is uncommon among Africans living in Africa.⁷

In 90 to 95 percent of hypertensive patients, a single reversible cause of the elevated BP cannot be identified hence, the term primary hypertension. In the remaining 5 to 10 percent, a more discrete mechanism can be identified, and the condition is termed secondary or identifiable hypertension.

There are certain behavioral determinants of hypertension. The nicotine in cigarette smoke transiently raises BP and hereby elevating the average daytime BP in habitual smokers. Regarding alcohol intake, the risk of hypertension is increased in heavy drinkers (three or more drinks per day). Caffeine consumption typically causes only a small transient rise in BP.⁸ Physical inactivity associates with a markedly increased risk of developing hypertension, in part because of weight gain. Lifetime dietary habits greatly influence the risk of developing hypertension. Diets low in fresh fruit may be associated with an increased risk of developing hypertension, perhaps because of lower citrate intake.⁹ The two most important behavioral determinants of hypertension, however, are excessive consumption of calories and salt. The risk of developing hypertension is linearly and tightly related to dietary sodium intake.¹⁰ Concordance of BPs is higher in families than in unrelated individuals, higher between monozygotic than dizygotic twins, and higher between biological than adoptive siblings living in the same household. Fourteen genes have been identified that cause mendelian forms of hypertension.¹¹

When hypertension is diagnosed in middle age (typically, 30 to 50 years of age), the most common BP pattern is elevated diastolic pressure with systolic pressure being

normal. Isolated diastolic hypertension is more common in men and is often associated with middle-age weight gain.¹² After age 60, isolated systolic hypertension (systolic BP higher than 140 mm Hg and diastolic BP lower than 90 mm Hg) is the most common form.¹³ At the other end of the age spectrum is isolated systolic hypertension in young adults who are typically 18 to 29 years of age. The key hemodynamic abnormalities are increased cardiac output presumably reflecting an overactive sympathetic nervous system.¹⁴

Methods

The study was conducted in people visited for 3 districts Ramechhap, Solukhumbu and Dolakha. Research camp was organized on 21-25 October 2009 and participants having age more than 18 years and willing to give consent were involved in the study. Apart from data collection for study, general health check up and counseling was also done as and when needed. Different organizations involved were Ecological Protection forum Nepal, International NGO Rescue Humanity from the United States and Local NGO Rainbow House Nepal. International and national volunteer Doctors, Dentists, Ophthalmologists, Pharmacists, Nurses, Hygienists etc provided the health services.

Total 600 patients were enrolled. The demographic data were recorded in registration unit. Blood pressure was recorded twice. The 1st reading was taken by trained nursing staff using standard Riva Rocci Sphygmomanometer after five minutes rest. The 2nd reading was taken by Physician and mean was calculated from both readings. The different stages of hypertension was categorized as per JNC 7th guidelines.

Results

A total of 600 patients involved in the study, 360 were male and 240 were female. The mean age of the study population was 48 years, while maximum and minimum age being 92 years and 18 years respectively. Altogether, 306 were found to be having systolic blood pressure > 120 mm of Hg and/or diastolic blood pressure >80 mm of Hg. Among them, 92 patients were having prehypertension, i.e. systolic blood pressure between 120 to 139 mm of Hg and/or diastolic blood pressure between 80 to 89 mm of Hg. Among them 53 were male and 39 were female. Moreover, 214 patients were actually hypertensives, having systolic blood pressure more than 139 mm of Hg and/or diastolic blood pressure more than 89 mm of Hg. The stage I hypertension was found in 130 cases, out of them 77 were male and 53 were female. Whereas stage II hypertension was found in 84 cases, including 40 males and 44 females. The JNC staging of total cases is shown in Figure 1.

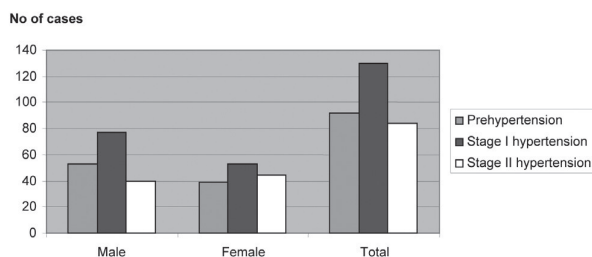


Fig.1: JNC staging of hypertension cases

The age wise distribution of different stages of hypertension is shown Tables 1, 2 & 3.

Table 1: Prehypertension in different age groups

Age groups	18-29	30-39	40-49	50-59	> 60
SBP 120-139	15	5	4	4	11
DBP 80-89	2	11	21	16	3

Table 2: Stage I hypertension in different age groups

Age groups	18-29	30-39	40-49	50-59	> 60
SBP 140-159	10	7	11	9	19
DBP 90-99	3	12	16	29	14

Table 3: Stage II hypertension in different age groups

Age groups	18-29	30-39	40-49	50-59	> 60
SBP >159	0	1	10	21	13
DBP >99	1	5	10	14	9

It is clear that prehypertension was commonest among 40-49 years of age, stage I and stage II hypertension was commonest among 50-59 years. While considering different values of systolic and diastolic blood pressure, systolic hypertension was more common in younger and elderly participants whereas diastolic hypertension was more common in middle age adults. The age group wise distribution of different components of hypertension has been shown in Table 4.

Table 4: Age group wise distribution of different ranges of systolic and diastolic blood pressure

Age groups	SBP 120-139	SBP 140-159	SBP >159	DBP 80-89	DBP 90-99	DBP >99	Total
18-29	15	10	0	2	3	1	31
30-39	5	7	1	11	12	5	41
40-49	4	11	10	21	16	10	72
50-59	4	9	21	16	29	14	93
> 60	11	19	13	3	14	9	69
Total	39	56	45	53	74	39	306

Discussion

Hypertension was found to be very common in the high hilly community of Nepal. The prevalence was 51% for abnormally high blood pressure. While excluding prehypertension, the actual prevalence of JNC stage I and stage II hypertension was 35%. The prevalence of hypertension among U.S. adults is 25 percent, though it is 35-40% in African American Group.⁷ So in high hilly areas of Nepal, prevalence of hypertension is comparable to that in American Blacks. So those cases who seek medical care and are diagnosed to be hypertensive make only the tip of the iceberg. The higher prevalence of hypertension in these areas may be due to certain behavioral patterns rampant over there. Higher consumption of locally made alcohol, using yak butter and salt in tea, higher rates of smoking and poor availability of fruits and vegetables may have role. As consumption of more alcohol, high intake of salt and low intake of citrates and potassium are definite risk factors for hypertension.^{8,9,10}

In the study, incidence of hypertension increases with age in both man and woman which is also indicated by Vasan et al in their study.⁶ Hypertension was more common in males than females in our study. Before age 50, the prevalence is lower in women but after menopause, it increases.⁶ It was commonest in 50-59 years age group than those more than 60 years which may be due to lower life expectancy of the population.

Conclusion

In this study, systolic hypertension was more common than diastolic hypertension in less than 30 years age group which may be due to overactive sympathetic nervous system as shown by McEniery et al¹⁴, where as between 30-59 years diastolic blood pressure was more commonly found than systolic blood pressure. In the elderly of more than 60 years, again systolic hypertension is more predominant than diastolic hypertension.

References

1. Campanini B: The World Health Report: Reducing Risks, Promoting Healthy Life, Geneva, World Health Organization, 2002.
2. Wolf-Maier K, Cooper RS, Kramer H, et al: Hypertension treatment and control in five European countries, Canada, and the United States. *Hypertension* 2004; 43:10.
3. Kaplan NM, Opie LH: Controversies in hypertension. *Lancet* 2006; 367:168.

4. Chobanian AV, Bakris GL, Black HR, et al: The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: The JNC 7 report. *JAMA* 2003; 289:2560.
5. Sipahi I, Tuzcu EM, Schoenhagen P, et al: Effects of normal, pre-hypertensive, and hypertensive blood pressure levels on progression of coronary atherosclerosis. *J Am Coll Cardiol* 2006; 48:833.
6. Vasan RS, Beiser A, Seshadri S, et al: Residual lifetime risk for developing hypertension in middle-aged women and men: The Framingham Heart Study. *JAMA* 2002; 287:1003.
7. Cooper RS, Wolf-Maier K, Luke A, et al: An international comparative study of blood pressure in populations of European vs. African descent. *BMC Med* 2005; 3:2.
8. Winkelmayr WC, Stampfer MJ, Willett WC, Curhan GC: Habitual caffeine intake and the risk of hypertension in women. *JAMA* 2005; 294:2330.
9. Taylor EN, Mount DB, Forman JP, Curhan GC: Association of prevalent hypertension with 24-hour urinary excretion of calcium, citrate, and other factors. *Am J Kidney Dis* 2006; 47:780.
10. Intersalt Cooperative Research Group : Intersalt: An international study of electrolyte excretion and blood pressure. Results for 24-hour urinary sodium and potassium excretion. *BMJ* 1988; 297:319.
11. Luft FC: Mendelian forms of human hypertension and mechanisms of disease. *Clin Med Res* 2003; 1:291.
12. Franklin SS, Pio JR, Wong ND, et al: Predictors of new-onset diastolic 2005; 8:1121
13. Franklin SS: Hypertension in older people: Part 1. *J Clin Hypertens (Greenwich)* 2006; 8:444.
14. McEniery CM, Yasmin , Wallace S, et al: Increased stroke volume and aortic stiffness contribute to isolated systolic hypertension in young adults. *Hypertension* 2005; 46:221-226.